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Flexitranstore
Gas Turbine

EngineeringMechanical Engineers' Handbook, Volume 4Desalination Updates

Modelling and Simulation of Power Generation Plants

A significant addition to the literature on gas turbine technology, the second edition of Gas Turbine Performance is a lengthy text covering product advances and technological developments. Including extensive figures, charts, tables and formulae, this book will interest everyone concerned with gas turbine technology, whether they are designers, marketing staff or users.

Technology Research and Development Efforts Related to the Energy and Water Linkage

Challenges of Power Engineering and Environment

This book tells the story of the power generation gas turbine from the perspective of one of the leading companies in the field over a period of nearly 100 years, written by an engineer. Especially in times of imminent global economic crises it appears to be worthwhile to reflect on real economic values based on engineering

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ingenuity and enduring management of technological leadership. Though the book is primarily designed as a technical history of the BBC/ABB/Alstom power generation gas turbines, its scope is sufficiently broad to cover general development trends, including parallel competitor activities. A special benefit is the historical breakdown to the gas turbine component level, so that the book actually outlines the development of axial compressors from early beginnings, the progress in combustion technology towards extraordinary low emission values and that of axial turbines with special emphasis on early turbine cooling innovations. The sheer length of certain engineering developments over several decades allows interesting historic observations and deductions on inherent business mechanisms, the effects of technology preparations and organisational consequences. A look into the mirror of the past provides revelations on the impact of far-reaching business decisions. 2017 Winner of the Historian Engineer Award of the ASME (American Society of Mechanical Engineers)

Fundamentals of Gas Turbines

The book is written for engineers and students who wish to address the preliminary design of gas turbine engines, as well as the associated performance calculations, in a practical manner. A basic knowledge of thermodynamics and turbomachinery is a prerequisite for understanding the concepts and ideas described. The book is also intended for teachers as a source of information for lecture materials and

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exercises for their students. It is extensively illustrated with examples and data from real engine cycles, all of which can be reproduced with GasTurb (TM). It discusses the practical application of thermodynamic, aerodynamic and mechanical principles. The authors describe the theoretical background of the simulation elements and the relevant correlations through which they are applied, however they refrain from detailed scientific derivations.

Progress in Gas Turbine Performance

Process Plant Machinery provides the mechanical, chemical or plant engineer with the information needed to choose equipment best suited for a particular process, to determine optimum efficiency, and to conduct basic troubleshooting and maintenance procedures. Process Plant Machinery is a unique single-source reference for engineers, managers and technical personnel who need to acquire an understanding of the machinery used in modern process plants: prime movers and power transmission machines; pumping equipment; gas compression machinery; and mixing, conveying, and separation equipment. Starting with an overview of each class, the book quickly leads the reader through practical applications and size considerations into profusely illustrated component descriptions. Where necessary, standard theory is expertly explained in shortcut formulas and graphs. Maintainability and vulnerability concerns are dealt with as well. Fully updated with all new equipment available Comprehensive Coverage Multi-industry relevance

Combined-cycle Gas & Steam Turbine Power Plants

This book constitutes the refereed proceedings of the 6th International Conference on Case-Based Reasoning, ICCBR 2005, held in Chicago, IL, USA, in August 2005. The 19 revised full research papers and 26 revised poster papers presented together with the abstracts of 3 invited talks were carefully reviewed and selected from 74 submissions. The papers address all current foundational, theoretical and research aspects of case-based reasoning as well as advanced applications either with innovative commercial deployment or practical, social, environmental or economic significance.

Gas Turbines

This book was developed directly from a series of Solar Turbines Incorporated internal short courses that were presented to an audience with a wide range of technical backgrounds, not necessarily related to turbomachinery. Thus, functional principles and physical understanding are emphasized, rather than the derivation of complicated mathematical equations. While the focus of this book is gas turbine theory, it is not intended to provide an in-depth knowledge of gas turbine aerodynamics or thermodynamics, nor is it intended to make the reader an expert in the field of turbomachinery. Readers will benefit from the many topics and

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theories that pertain to the subject matter. The text emphasizes simplified explanations of complex physical theories. Hopefully, readers will utilize this book to develop an appreciation of the many engineering disciplines that are involved in the design and analysis of gas turbines. Readers are also encouraged to further investigate a wide range of topics by studying more specific, subject-matter literature.

Introduction to Gas Turbine Theory

Industrial Gas Turbines: Performance and Operability explains important aspects of gas turbine performance such as performance deterioration, service life and engine emissions. Traditionally, gas turbine performance has been taught from a design perspective with insufficient attention paid to the operational issues of a specific site. Operators are not always sufficiently familiar with engine performance issues to resolve operational problems and optimise performance. Industrial Gas Turbines: Performance and Operability discusses the key factors determining the performance of compressors, turbines, combustion and engine controls. An accompanying engine simulator CD illustrates gas turbine performance from the perspective of the operator, building on the concepts discussed in the text. The simulator is effectively a virtual engine and can be subjected to operating conditions that would be dangerous and damaging to an engine in real-life conditions. It also deals with issues of engine deterioration, emissions and turbine

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life. The combined use of text and simulators is designed to allow the reader to better understand and optimise gas turbine operation. Discusses the key factors in determining the performance of compressors, turbines, combustion and engine controls Explains important aspects of gas and turbine performance such as service life and engine emissions Accompanied by CD illustrating gas turbine performance, building on the concepts discussed in the text

Gas Turbines

This book presents current research in the area of gas turbines for different applications. It is a highly useful book providing a variety of topics ranging from basic understanding about the materials and coatings selection, designing and modeling of gas turbines to advanced technologies for their ever increasing efficiency, which is the need of the hour for modern gas turbine industries. The target audience for this book is material scientists, gas turbine engine design and maintenance engineers, manufacturers, mechanical engineers, undergraduate, post graduate students and academic researchers. The design and maintenance engineers in aerospace and gas turbine industry will benefit from the contents and discussions in this book. This book presents current research in the area of gas turbines for different applications. It is a highly useful book providing a variety of topics ranging from basic understanding about the materials and coatings selection, designing and modeling of gas turbines to advanced technologies for

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their ever increasing efficiency, which is the need of the hour for modern gas turbine industries. The target audience for this book is material scientists, gas turbine engine design and maintenance engineers, manufacturers, mechanical engineers, undergraduate, post graduate students and academic researchers. The design and maintenance engineers in aerospace and gas turbine industry will benefit from the contents and discussions in this book.

Gas Turbine Powerhouse

The Gas Turbine Engineering Handbook has been the standard for engineers involved in the design, selection, and operation of gas turbines. This revision includes new case histories, the latest techniques, and new designs to comply with recently passed legislation. By keeping the book up to date with new, emerging topics, Boyce ensures that this book will remain the standard and most widely used book in this field. The new Third Edition of the Gas Turbine Engineering Hand Book updates the book to cover the new generation of Advanced gas Turbines. It examines the benefit and some of the major problems that have been encountered by these new turbines. The book keeps abreast of the environmental changes and the industries answer to these new regulations. A new chapter on case histories has been added to enable the engineer in the field to keep abreast of problems that are being encountered and the solutions that have resulted in solving them. Comprehensive treatment of Gas Turbines from Design to Operation and

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Maintenance. In depth treatment of Compressors with emphasis on surge, rotating stall, and choke; Combustors with emphasis on Dry Low NOx Combustors; and Turbines with emphasis on Metallurgy and new cooling schemes. An excellent introductory book for the student and field engineers A special maintenance section dealing with the advanced gas turbines, and special diagnostic charts have been provided that will enable the reader to troubleshoot problems he encounters in the field The third edition consists of many Case Histories of Gas Turbine problems. This should enable the field engineer to avoid some of these same generic problems

Power Generation Technologies

This book constitutes the thoroughly refereed post-conference proceedings of the 20th International Conference on Case-Based Reasoning Research and Development (ICCBR 2012) held in Lyon, France, September 3-6, 2012. The 34 revised full papers presented were carefully selected from 51 submissions. The presentations and posters covered a wide range of CBR topics of interest to both practitioners and researchers, including foundational issues covering case representation, similarity, retrieval, and adaptation; conversational CBR recommender systems; multi-agent collaborative systems; data mining; time series analysis; Web applications; knowledge management; legal reasoning; healthcare systems and planning and scheduling systems.

Thermal Power Plant Performance Analysis

The objective is to provide the latest developments in the area of soft computing. These are the cutting edge technologies that have immense application in various fields. All the papers will undergo the peer review process to maintain the quality of work.

Modern Gas Turbine Systems

This book is the proceedings of the International Conference on Power Engineering-2007. The fields of this book include power engineering and relevant environmental issues. The recent technological advances in power engineering and related areas are introduced. This book is valuable for researchers, engineers and students majoring in power engineering.

Commercial Aircraft Propulsion and Energy Systems Research

Covering basic theory, components, installation, maintenance, manufacturing, regulation and industry developments, Gas Turbines: A Handbook of Air, Sea and Land Applications is a broad-based introductory reference designed to give you the knowledge needed to succeed in the gas turbine industry, land, sea and air

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applications. Providing the big picture view that other detailed, data-focused resources lack, this book has a strong focus on the information needed to effectively decision-make and plan gas turbine system use for particular applications, taking into consideration not only operational requirements but long-term life-cycle costs in upkeep, repair and future use. With concise, easily digestible overviews of all important theoretical bases and a practical focus throughout, Gas Turbines is an ideal handbook for those new to the field or in the early stages of their career, as well as more experienced engineers looking for a reliable, one-stop reference that covers the breadth of the field. Covers installation, maintenance, manufacturer's specifications, performance criteria and future trends, offering a rounded view of the area that takes in technical detail as well as well as industry economics and outlook Updated with the latest industry developments, including new emission and efficiency regulations and their impact on gas turbine technology Over 300 pages of new/revised content, including new sections on microturbines, non-conventional fuel sources for microturbines, emissions, major developments in aircraft engines, use of coal gas and superheated steam, and new case histories throughout highlighting component improvements in all systems and sub-systems.

Case-Based Reasoning Research and Development

Modern gas turbine power plants represent one of the most efficient and economic

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conventional power generation technologies suitable for large-scale and smaller scale applications. Alongside this, gas turbine systems operate with low emissions and are more flexible in their operational characteristics than other large-scale generation units such as steam cycle plants. Gas turbines are unrivalled in their superior power density (power-to-weight) and are thus the prime choice for industrial applications where size and weight matter the most. Developments in the field look to improve on this performance, aiming at higher efficiency generation, lower emission systems and more fuel-flexible operation to utilise lower-grade gases, liquid fuels, and gasified solid fuels/biomass. Modern gas turbine systems provides a comprehensive review of gas turbine science and engineering. The first part of the book provides an overview of gas turbine types, applications and cycles. Part two moves on to explore major components of modern gas turbine systems including compressors, combustors and turbogenerators. Finally, the operation and maintenance of modern gas turbine systems is discussed in part three. The section includes chapters on performance issues and modelling, the maintenance and repair of components and fuel flexibility. Modern gas turbine systems is a technical resource for power plant operators, industrial engineers working with gas turbine power plants and researchers, scientists and students interested in the field. Provides a comprehensive review of gas turbine systems and fundamentals of a cycle Examines the major components of modern systems, including compressors, combustors and turbines Discusses the operation and maintenance of component

parts

Microturbines

This book focuses on the development of novel combustion approaches and burner designs for clean power generation in gas turbines. It shows the reader how to control the release of pollutants to the environment in an effort to reduce global warming. After an introduction to global warming issues and clean power production for gas turbine applications, subsequent chapters address premixed combustion, burner designs for clean power generation, gas turbine performance, and insights on gas turbine operability. Given its scope, the book can be used as a textbook for graduate-level courses on clean combustion, or as a reference book to accompany compact courses for mechanical engineers and young researchers around the world.

Approaches for Clean Combustion in Gas Turbines

Small-scale gas turbines, known as Microturbines, represent an exciting new development in gas turbine technology. They can run in size from small, human-scale machines down to micro-sized mini-machines that can barely be seen by the naked eye. They also run a great diversity of fuel types, from various types of

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commercial gases to waste-generated gases. This new book by industry expert Claire Soares will fully describe the various types of microturbines, their applications, and their particular requirements for installation, maintenance and repair. It will explain how a microturbine the size of a refrigerator can power an entire school, hospital or small factory, which is particularly useful for onsite, remote installations. The book will also show how microturbines can be paired with one or more fuel cells to form a hybrid energy source, or can be teamed with any source of distributed power, such as a small hydro-turbine or a wind turbine. Moreover, the reader will learn how microturbines can run on a variety of fuels that are far cruder than those required by most standard gas turbines; they can be made to run, for instance, using gas from a landfill or biomass source. The reader will find detailed information on costs, specifications, and maintenance and repair guidelines. Ample references and resources will provide the reader with tools for finding manufacturers and product specifications for their own particular needs. Covers major categories of microturbines, including factors common to their design, installation, operation, optimization, maintenance, and repair Invaluable guidance on market factors and economics affecting microturbines and their applications, particularly for distributed power generation Provides current case studies showing microturbines used in hybrid systems with fuel cells and other types of power generation systems

Alternative Energy Systems and Applications

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This book assesses the state of the art of coatings materials and processes for gas-turbine blades and vanes, determines potential applications of coatings in high-temperature environments, identifies needs for improved coatings in terms of performance enhancements, design considerations, and fabrication processes, assesses durability of advanced coating systems in expected service environments, and discusses the required inspection, repair, and maintenance methods. The promising areas for research and development of materials and processes for improved coating systems and the approaches to increased coating standardization are identified, with an emphasis on materials and processes with the potential for improved performance, quality, reproducibility, or manufacturing cost reduction.

Gas Turbine Engineering Handbook

There has been a remarkable difference in the research and development regarding gas turbine technology for transportation and power generation. The former remains substantially florid and unaltered with respect to the past as the superiority of air-breathing engines compared to other technologies is by far immense. On the other hand, the world of gas turbines (GTs) for power generation is indeed characterized by completely different scenarios in so far as new challenges are coming up in the latest energy trends, where both a reduction in

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the use of carbon-based fuels and the raising up of renewables are becoming more and more important factors. While being considered a key technology for base-load operations for many years, modern stationary gas turbines are in fact facing the challenge to balance electricity from variable renewables with that from flexible conventional power plants. The book intends in fact to provide an updated picture as well as a perspective view of some of the abovementioned issues that characterize GT technology in the two different applications: aircraft propulsion and stationary power generation. Therefore, the target audience for it involves design, analyst, materials and maintenance engineers. Also manufacturers, researchers and scientists will benefit from the timely and accurate information provided in this volume. The book is organized into three main sections including 10 chapters overall: (i) Gas Turbine and Component Performance, (ii) Gas Turbine Combustion and (iii) Fault Detection in Systems and Materials.

Case-Based Reasoning Research and Development

This book makes intelligible the wide range of electricity generating technologies available today, as well as some closely allied technologies such as energy storage. The book opens by setting the many power generation technologies in the context of global energy consumption, the development of the electricity generation industry and the economics involved in this sector. A series of chapters are each devoted to assessing the environmental and economic impact of a single

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technology, including conventional technologies, nuclear and renewable (such as solar, wind and hydropower). The technologies are presented in an easily digestible form. Different power generation technologies have different greenhouse gas emissions and the link between greenhouse gases and global warming is a highly topical environmental and political issue. With developed nations worldwide looking to reduce their emissions of carbon dioxide, it is becoming increasingly important to explore the effectiveness of a mix of energy generation technologies. Power Generation Technologies gives a clear, unbiased review and comparison of the different types of power generation technologies available. In the light of the Kyoto protocol and OSPAR updates, Power Generation Technologies will provide an invaluable reference text for power generation planners, facility managers, consultants, policy makers and economists, as well as students and lecturers of related Engineering courses. · Provides a unique comparison of a wide range of power generation technologies - conventional, nuclear and renewable · Describes the workings and environmental impact of each technology · Evaluates the economic viability of each different power generation system

The National Energy Plan

Covering basic theory, components, installation, maintenance, manufacturing, regulation and industry developments, Gas Turbines: A Handbook of Air, Sea and

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Land Applications is a broad-based introductory reference designed to give you the knowledge needed to succeed in the gas turbine industry, land, sea and air applications. Providing the big picture view that other detailed, data-focused resources lack, this book has a strong focus on the information needed to effectively decision-make and plan gas turbine system use for particular applications, taking into consideration not only operational requirements but long-term life-cycle costs in upkeep, repair and future use. With concise, easily digestible overviews of all important theoretical bases and a practical focus throughout, Gas Turbines is an ideal handbook for those new to the field or in the early stages of their career, as well as more experienced engineers looking for a reliable, one-stop reference that covers the breadth of the field. Covers installation, maintenance, manufacturer's specifications, performance criteria and future trends, offering a rounded view of the area that takes in technical detail as well as well as industry economics and outlook Updated with the latest industry developments, including new emission and efficiency regulations and their impact on gas turbine technology Over 300 pages of new/revised content, including new sections on microturbines, non-conventional fuel sources for microturbines, emissions, major developments in aircraft engines, use of coal gas and superheated steam, and new case histories throughout highlighting component improvements in all systems and sub-systems.

Process Plant Machinery

Propulsion and Power

The analysis of the reliability and availability of power plants is frequently based on simple indexes that do not take into account the criticality of some failures used for availability analysis. This criticality should be evaluated based on concepts of reliability which consider the effect of a component failure on the performance of the entire plant. System reliability analysis tools provide a root-cause analysis leading to the improvement of the plant maintenance plan. Taking in view that the power plant performance can be evaluated not only based on thermodynamic related indexes, such as heat-rate, Thermal Power Plant Performance Analysis focuses on the presentation of reliability-based tools used to define performance of complex systems and introduces the basic concepts of reliability, maintainability and risk analysis aiming at their application as tools for power plant performance improvement, including: · selection of critical equipment and components, · definition of maintenance plans, mainly for auxiliary systems, and · execution of decision analysis based on risk concepts. The comprehensive presentation of each analysis allows future application of the methodology making Thermal Power Plant Performance Analysis a key resource for undergraduate and postgraduate students in mechanical and nuclear engineering.

Coatings for High-Temperature Structural Materials

The escalating use of aircraft in the 21st century demands a thorough understanding of engine propulsion concepts, including the performance of aero engines. Among other critical activities, gas turbines play an extensive role in electric power generation, and marine propulsion for naval vessels and cargo ships. In the most exhaustive volume to date, this text examines the foundation of aircraft propulsion: aerodynamics interwoven with thermodynamics, heat transfer, and mechanical design. With a finely focused approach, the author devotes each chapter to a particular engine type, such as ramjet and pulsejet, turbojet, and turbofan. Supported by actual case studies, he illustrates engine performance under various operating conditions. Part I discusses the history, classifications, and performance of air breathing engines. Beginning with Leonardo and continuing on to the emergence of the jet age and beyond, this section chronicles inventions up through the 20th century. It then moves into a detailed discussion of different engine types, including pulsejet, ramjet, single- and multi-spool turbojet, and turbofan in both subsonic and supersonic applications. The author discusses Vertical Take Off and Landing aircraft, and provides a comprehensive examination of hypersonic scramjet and turbo ramjet engines. He also analyzes the different types of industrial gas turbines having single- and multi-spool with intercoolers, regenerators, and reheaters. Part II investigates the design of rotating compressors and turbines, and non-rotating components, intakes, combustion chambers, and

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nozzles for all modern jet propulsion and gas turbine engine systems, along with their performance. Every chapter concludes with illustrative examples followed by a problems section; for greater clarity, some provide a listing of important mathematical relations.

Turbomachinery International Handbook

This title provides a reference on technical and economic factors of combined-cycle applications within the utility and cogeneration markets. Kehlhofer - and his co-authors give the reader tips on system layout, details on controls and automation, and operating instructions.

Gas Turbines

Presents the fundamentals of the gas turbine engine, including cycles, components, component matching, and environmental considerations.

Modern Gas Turbine Systems

Desalination Update illustrates the growing research and development activities in the field of desalination of water. The chapters in this book also show the close link

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in the supply of water and supply of power. Power is needed to desalinate water, and water is needed to produce power via steam and cooling water. As the world is becoming increasingly in need of water and power, the education of generations of new workers in these technologies makes the publications of these books of rising importance. Students and specialists alike will find branching strands in this field of development worthy of dedication of careers. Never has shrinking essential resources and exploding needs confront mankind as much as water. Excellent reviews in this book provide keywords, concepts, and current knowledge and status of practice useful for teaching and continued evolution.

Gas Turbine Performance

Critical Infrastructure Protection Reliability Standards (US Federal Energy Regulatory Commission Regulation) (FERC) (2018 Edition) The Law Library presents the complete text of the Critical Infrastructure Protection Reliability Standards (US Federal Energy Regulatory Commission Regulation) (FERC) (2018 Edition). Updated as of May 29, 2018 The Federal Energy Regulatory Commission (Commission) approves seven critical infrastructure protection (CIP) Reliability Standards: CIP-003-6 (Security Management Controls), CIP-004-6 (Personnel and Training), CIP-006-6 (Physical Security of BES Cyber Systems), CIP-007-6 (Systems Security Management), CIP-009-6 (Recovery Plans for BES Cyber Systems), CIP-010-2 (Configuration Change Management and Vulnerability Assessments), and

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CIP-011-2 (Information Protection). The proposed Reliability Standards address the cyber security of the bulk electric system and improve upon the current Commission-approved CIP Reliability Standards. In addition, the Commission directs NERC to develop certain modifications to improve the CIP Reliability Standards. This book contains: - The complete text of the Critical Infrastructure Protection Reliability Standards (US Federal Energy Regulatory Commission Regulation) (FERC) (2018 Edition) - A table of contents with the page number of each section

Aircraft Propulsion and Gas Turbine Engines

Everything you wanted to know about industrial gas turbines for electric power generation in one source with hard-to-find, hands-on technical information.

Gas Turbines for Electric Power Generation

This book offers gas turbine users and manufacturers a valuable resource to help them sort through issues associated with combustion instabilities. In the last ten years, substantial efforts have been made in the industrial, governmental, and academic communities to understand the unique issues associated with combustion instabilities in low-emission gas turbines. The objective of this book is

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to compile these results into a series of chapters that address the various facets of the problem. The Case Studies section speaks to specific manufacturer and user experiences with combustion instabilities in the development stage and in fielded turbine engines. The book then goes on to examine The Fundamental Mechanisms, The Combustor Modeling, and Control Approaches.

Combustion Instabilities in Gas Turbine Engines

The comprehensive guide to engineering alternative and renewable energy systems and applications—updated for the latest trends and technologies This book was designed to help engineers develop new solutions for the current energy economy. To that end it provides technical discussions, along with numerous real-world examples of virtually all existing alternative energy sources, applications, systems and system components. All chapters focus on first-order engineering calculations, and consider alternative uses of existing and renewable energy resources. Just as important, the author describes how to apply these concepts to the development of new energy solutions. Since the publication of the critically acclaimed first edition of this book, the alternative, renewable and sustainable energy industries have witnessed significant evolution and growth. Hydraulic fracturing, fossil fuel reserve increases, the increasing popularity of hybrid and all-electric vehicles, and the decreasing cost of solar power already have had a significant impact on energy usage patterns worldwide. Updated and revised to

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reflect those and other key developments, this new edition features expanded coverage of topics covered in the first edition, as well as entirely new chapters on hydraulic fracturing and fossil fuels, hybrid and all-electric vehicles, and more. Begins with a fascinating look at the changing face of global energy economy Features chapters devoted to virtually all sources of alternative energy and energy systems Offers technical discussions of hydropower, wind, passive solar and solar-thermal, photovoltaics, fuel cells, CHP systems, geothermal, ocean energy, biomass, and nuclear Contains updated chapter review questions, homework problems, and a thoroughly revised solutions manual, available on the companion website While Alternative Energy Systems and Applications, Second Edition is an ideal textbook/reference for advanced undergraduate and graduate level engineering courses in energy-related subjects, it is also an indispensable professional resource for engineers and technicians working in areas related to the development of alternative/renewable energy systems.

Turbomachinery International

This open access book comprises 10 high-level papers on research and innovation within the Flexitranstore Project that were presented at the FLEXITRANSTORE special session organized as part of the 21st International Symposium on High Voltage Engineering. FLEXITRANSTORE (An Integrated Platform for Increased FLEXibility in smart TRANSMission grids with STORAge Entities and large

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penetration of Renewable Energy Sources) aims to contribute to the development of a pan-European transmission network with high flexibility and high interconnection levels. This will facilitate the transformation of the current energy production mix by hosting an increasing share of renewable energy sources. Novel smart grid technologies, control and storage methods, and new market approaches will be developed, installed, demonstrated, and tested introducing flexibility to the European power system. FLEXITRANSTORE is developing a next-generation Flexible Energy Grid (FEG) that will be integrated into the European Internal Energy Market (IEM) through the valorization of flexibility services. This FEG addresses the capabilities of a power system to maintain continuous service in the face of rapid and large swings in supply or demand. As such, a wholesale market infrastructure and new business models within this integrated FEG must be upgraded for network players, and offer incentives for new ones to join, while at the same time demonstrating new business perspectives for cross-border resource management and energy trading.

Gas Turbine Combined Cycle Power Plants

Industrial Gas Turbines

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Modern gas turbine power plants represent one of the most efficient and economic conventional power generation technologies suitable for large-scale and smaller scale applications. Alongside this, gas turbine systems operate with low emissions and are more flexible in their operational characteristics than other large-scale generation units such as steam cycle plants. Gas turbines are unrivalled in their superior power density (power-to-weight) and are thus the prime choice for industrial applications where size and weight matter the most. Developments in the field look to improve on this performance, aiming at higher efficiency generation, lower emission systems and more fuel-flexible operation to utilise lower-grade gases, liquid fuels, and gasified solid fuels/biomass. Modern gas turbine systems provides a comprehensive review of gas turbine science and engineering. The first part of the book provides an overview of gas turbine types, applications and cycles. Part two moves on to explore major components of modern gas turbine systems including compressors, combustors and turbogenerators. Finally, the operation and maintenance of modern gas turbine systems is discussed in part three. The section includes chapters on performance issues and modelling, the maintenance and repair of components and fuel flexibility. Modern gas turbine systems is a technical resource for power plant operators, industrial engineers working with gas turbine power plants and researchers, scientists and students interested in the field. Provides a comprehensive review of gas turbine systems and fundamentals of a cycle Examines the major components of modern systems, including compressors,

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combustors and turbines Discusses the operation and maintenance of component parts

Proceedings of the International Conference on Soft Computing for Problem Solving (SocProS 2011) December 20-22, 2011

Vols. for 1977- include a section: Turbomachinery world news, called v. 1-

Critical Infrastructure Protection Reliability Standards (Us Federal Energy Regulatory Commission Regulation) (Ferc) (2018 Edition)

The primary human activities that release carbon dioxide (CO₂) into the atmosphere are the combustion of fossil fuels (coal, natural gas, and oil) to generate electricity, the provision of energy for transportation, and as a consequence of some industrial processes. Although aviation CO₂ emissions only make up approximately 2.0 to 2.5 percent of total global annual CO₂ emissions, research to reduce CO₂ emissions is urgent because (1) such reductions may be legislated even as commercial air travel grows, (2) because it takes new technology a long time to propagate into and through the aviation fleet, and (3) because of the ongoing impact of global CO₂ emissions. Commercial Aircraft

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Propulsion and Energy Systems Research develops a national research agenda for reducing CO2 emissions from commercial aviation. This report focuses on propulsion and energy technologies for reducing carbon emissions from large, commercial aircraft—single-aisle and twin-aisle aircraft that carry 100 or more passengers—because such aircraft account for more than 90 percent of global emissions from commercial aircraft. Moreover, while smaller aircraft also emit CO2, they make only a minor contribution to global emissions, and many technologies that reduce CO2 emissions for large aircraft also apply to smaller aircraft. As commercial aviation continues to grow in terms of revenue-passenger miles and cargo ton miles, CO2 emissions are expected to increase. To reduce the contribution of aviation to climate change, it is essential to improve the effectiveness of ongoing efforts to reduce emissions and initiate research into new approaches.

Flexitranstore

This book covers the design, analysis, and optimization of the cleanest, most efficient fossil fuel-fired electric power generation technology at present and in the foreseeable future. The book contains a wealth of first principles-based calculation methods comprising key formulae, charts, rules of thumb, and other tools developed by the author over the course of 25+ years spent in the power generation industry. It is focused exclusively on actual power plant systems and

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actual field and/or rating data providing a comprehensive picture of the gas turbine combined cycle technology from performance and cost perspectives. Material presented in this book is applicable for research and development studies in academia and government/industry laboratories, as well as practical, day-to-day problems encountered in the industry (including OEMs, consulting engineers and plant operators).

Gas Turbine Engineering

The engineer's ready reference for mechanical power and heat Mechanical Engineer's Handbook provides the most comprehensive coverage of the entire discipline, with a focus on explanation and analysis. Packaged as a modular approach, these books are designed to be used either individually or as a set, providing engineers with a thorough, detailed, ready reference on topics that may fall outside their scope of expertise. Each book provides discussion and examples as opposed to straight data and calculations, giving readers the immediate background they need while pointing them toward more in-depth information as necessary. Volume 4: Energy and Power covers the essentials of fluids, thermodynamics, entropy, and heat, with chapters dedicated to individual applications such as air heating, cryogenic engineering, indoor environmental control, and more. Readers will find detailed guidance toward fuel sources and their technologies, as well as a general overview of the mechanics of combustion. No

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single engineer can be a specialist in all areas that they are called on to work in the diverse industries and job functions they occupy. This book gives them a resource for finding the information they need, with a focus on topics related to the production, transmission, and use of mechanical power and heat. Understand the nature of energy and its proper measurement and analysis. Learn how the mechanics of energy apply to furnaces, refrigeration, thermal systems, and more. Examine the pros and cons of petroleum, coal, biofuel, solar, wind, and geothermal power. Review the mechanical parts that generate, transmit, and store different types of power, and the applicable guidelines. Engineers must frequently refer to data tables, standards, and other list-type references, but this book is different; instead of just providing the answer, it explains why the answer is what it is. Engineers will appreciate this approach, and come to find Volume 4: Energy and Power an invaluable reference.

Mechanical Engineers' Handbook, Volume 4

Many large-scale processes like refineries or power generation plants are constructed using the multi-vendor system and a main co-ordinating engineering contractor. With such a methodology, the key process units are installed complete with local proprietary control systems in place. Re-assessing the so-called lower level control loop design or structure is becoming less feasible or desirable. Consequently, future competitive gains in large-scale industrial systems will arise

from the closer and optimised global integration of the process sub-units. This is one of the inherent commercial themes which motivated the research reported in this monograph. To access the efficiency and feasibility of different large-scale system designs, the traditional tool has been the global steady-state analysis and energy balance. The process industries have many such tools encapsulated as proprietary design software. However, to obtain a vital and critical insight into global process operation a dynamic model and simulation is necessary. Over the last decade, the whole state of the art in system simulation has irrevocably changed. The Graphical User Interface (G UI) and icon based simulation approach is now standard with hardware platforms becoming more and more powerful. This immediately opens the way to some new and advanced large-scale dynamic simulation developments. For example, click-together blocks from standard or specialised libraries of process units are perfectly feasible now.

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